

## **CLAIMS**

What is claimed is:

1. A system for producing electrochemical conversion in an electrochemical device comprising:  
a power converter connectable to the electrochemical device; and  
a triggering circuit connectable to the power converter, the triggering circuit comprising a pulse generator to trigger the power converter to generate positive pulses of current for passing through the electrochemical device causing electrochemical conversion in the electrochemical device.
2. A system according to claim 1, wherein the electrochemical device is a battery.
3. A system according to claim 1, wherein the electrochemical device is a primary cell, for example a dry battery.
4. A system according to claim 1, wherein the electrochemical device is a secondary cell, for example a lead acid battery.
5. A system according to claim 1, wherein the electrochemical device is an electroplating apparatus.

6. A system according to claim 1, wherein the power converter is arranged to generate pulses of current having a duration of between around 50 to around 1000 microseconds.
7. A system according to claim 1, wherein the pulses of current have a substantially constant pulse width, the pulse width being controlled by the power converter.
8. A system according to claim 1, wherein the pulses of current have an amplitude around one hundred times the amplitude of current required to charge or discharge completely the available capacity of the battery over a twenty hour period ( $C_{20}$  charge).
9. A system according to claim 1, wherein the electrochemical device has a settling time of between around 1 to 10 milliseconds to produce a duty cycle of between around 1:10 to around 1:200.
10. A system according to claim 1, wherein the power converter comprises one or more pairs of inductor/capacitor combinations connectable as one or more series resonant circuits.
11. A system according to claim 10, wherein the power converter has a low impedance.

12. A system according to claim 1, wherein the power converter comprises at least two inductors and at least two capacitors to form two or more series resonant circuits in parallel, arranged such that the currents in the inductors are unidirectional and the currents in the capacitors are bidirectional.

13. A system according to claim 12, wherein the windings of the at least two inductors are wound on a single core.

14. A system according to claim 13, wherein a first further winding is arranged on the core to form a step-down transformer.

15. A system according to claim 14, wherein the further winding is arranged to provide unidirectional current pulses to the electrochemical device via a rectifying diode.

16. A system according to claim 14, further comprising a second further winding arranged on the core to form a demagnetisation winding.

17. A system according to claim 1, wherein the triggering circuit comprises a pulse generator for producing firing current pulses for a number of thyristors connectable to the power converter and the pulse generator to control the charging and discharging of the resonant circuit(s) by switching between components of the resonant circuit(s).

18. A system according to claim 17, wherein the power converter is arranged such that the current therethrough reverses in the second half of the oscillation cycle to turn off the thyristor(s).

19. A system according to claim 1, wherein the system further comprises a second pulse generator connectable to a second power converter, the second power converter being connectable to the electrochemical device for producing a negative current pulse between the positive current pulses generated by the first power converter for reducing the amount of gas produced in the electrochemical device due to the positive current pulses.

20. A system according to claim 19, wherein the negative current pulse(s) have an energy content and the positive current pulse(s) have an energy content, the energy content of the negative current pulse(s) being less than the energy content of the positive current pulse(s).

21. A system according to claim 1, wherein the power converter comprises a resonant circuit.

22. A method for producing electrochemical conversion in an electrochemical device comprising triggering a power converter to generate positive current pulses through the electrochemical device to produce the electrochemical conversion.

23. A method for producing electrochemical conversion in a system according to claim 1.